

**Parental socio-economic status and childcare quality: Early inequalities in educational
opportunity?**

Juliane F. Stahl^{1,2}, Pia S. Schober^{1,3} and C. Katharina Spiess^{1,4}

¹German Institute for Economic Research (DIW Berlin), ²International Max Planck Research School on the Life Course, ³University of Tübingen, and ⁴Freie Universität Berlin

This is a pre-copyedited, author-produced PDF of an article accepted for publication in *Early Childhood Education Quarterly* following peer review. The version of record [Stahl, J. F., Schober, P. S. and Spiess, C. K. (2017) Parental socio-economic status and childcare quality: Early inequalities in educational opportunity?, *Early Childhood Education Quarterly*, published online 20 November 2017] is available online at:

<https://www.sciencedirect.com/science/article/pii/S0885200617300169>

Acknowledgements: The authors wish to thank Susanne Kuger for giving valuable advice on measurements of ECEC quality. The authors are also grateful for comments by participants of several conferences including the GEBF 2016, the SOEP 2016 and the SLLS 2016.

Funding: This work was financially supported by the Jacobs Foundation (Project no. 2013-1063).

Abstract

This study examines whether children from potentially disadvantaged families attend early childhood education and care (ECEC) centers of lower quality compared to more advantaged children in the universal and strongly state-subsidized ECEC system in Germany. We combine the representative German Socio-Economic Panel (SOEP) with the 2014 K²ID-SOEP extension study on ECEC quality. We run linear and logistic regression models of 32 quality indicators based on 818 children who attend 749 ECEC groups in 647 centers. The findings provide evidence that migrant children and in particular children of low-educated parents experience moderately lower quality levels on some structural and orientation quality characteristics. Children from income poor or single parent households receive lower quality on few, mostly hardly observable characteristics. In conclusion, financial resources may be less critical for families' use of high-quality ECEC than knowledge, preferences, or networks which are stratified by educational qualifications and culture.

Keywords: childcare quality; early childhood education and care; early disadvantage; social inequality; socio-economic status

Parental Socio-Economic Status and Childcare Quality: Early Inequalities in Educational Opportunity?

In recent years, the percentage of children attending early childhood education and care (ECEC) institutions has risen substantially in many industrialized countries. Studies about the impact of ECEC attendance tend to indicate positive effects on children's development, especially in the domain of cognitive competencies (for literature reviews, see e.g., Burger, 2010; Gormley, Phillips, & Gayer, 2008). An increasing body of research has shown, however, that the effect of ECEC attendance depends on the quality of the interactions and learning environment in these institutions (Anders et al., 2012; Dearing, McCartney, & Taylor, 2009; Keys, et al., 2013). It is well established that the use of ECEC institutions correlates positively with family socio-economic status (SES) in most countries, especially at younger ages (Bainbridge, Meyers, Tanaka, & Waldfogel, 2005; Liang, Fuller, & Singer, 2000; Schober & Spiess, 2013; Stahl & Schober, 2017). Much less is known about parental choices of ECEC centers with certain characteristics that can contribute to children's development.

In this study, we explore whether children from potentially disadvantaged families attend ECEC centers of lower quality compared to more advantaged children. We concentrate on four potentially disadvantaged groups, which overlap only partially in the data: (1) children with a low-educated parent, (2) children with migration background, (3) children from income poor households, and (4) children who live with a single parent. This approach could give a hint at possible underlying mechanisms. In the German context, the term migration background is commonly used to describe children with at least one parent born abroad. Most of the children themselves have been born in Germany. The most frequent countries of origin of the parents are Turkey, member states of the former Soviet Union as well as former Yugoslavia, Italy and Greece.

We analyze a large set of indicators of structural and orientation quality as well as networking with families, which have been shown to relate to process quality and child development. The paper's objective is to provide exploratory evidence about parental choices of ECEC on the one hand, and about whether children face unequal starting conditions at the beginning of their educational career on the other hand. We discuss how links between socio-economic status and ECEC quality might come about theoretically and test empirically whether the degree of accessible information on ECEC quality moderates these associations.

Our analyses are based on a novel, nationally representative German dataset. Due to near universal ECEC attendance among children aged three years and over, Germany represents an interesting case, where the question of whether or not to attend an ECEC center has been replaced by the question at which age to enter and which ECEC institution to choose. The latter question is particularly relevant, as considerable variations in the quality (Tietze et al., 2013) and composition (Statistisches Bundesamt, 2013) of German ECEC centers have been found, while there is no systematic information on the quality of particular centers for the public. There are no Quality Rating and Improvement Systems as they exist or are currently being developed in virtually all US states (e.g.; Goffin & Barnett, 2015). At the same time, compared to other countries the ECEC system in Germany has been rather homogeneous in terms of access and costs due to universal state-subsidized provision and fairly low, often income-adjusted fees for parents. This provides us with the opportunity to test whether 'parental choices'¹ of ECEC institutions of varying quality differ systematically by socio-economic background characteristics even in a strongly state-subsidized ECEC system. It also allows for contextual comparisons to the childcare market in the United States, which most previous evidence on associations between family characteristics and ECEC

¹ Please note that the following analyses cannot examine parental choices directly. The observed patterns may be the result of parents' choices, (possibly discriminatory) admission practices of ECEC centers, different opportunities in families' local environment, or an interplay between these factors.

quality has been based on. Before reviewing the existing literature, the next section will first elaborate on the different components and measures of ECEC quality, and how these relate to child development.

Conceptualization of Qualitative Characteristics of ECEC Environments

It is well-established that ECEC quality can be divided into different components, namely structural quality, process quality, orientation quality and networking with families (e.g., Kluczniok & Roßbach, 2014; NICHD Early Child Care Research Network, 2002; Tietze et al., 2013). Following the structure-process model of quality, while each component may impact children and their families separately, process quality mediates or moderates the influences of all other components (Kluczniok & Roßbach, 2014). Process quality in ECEC institutions includes the entirety of pedagogical interactions and children's experiences with the social and material environment, which has been found to affect children's development although the effect sizes vary (Anders et al., 2012; Belsky et al., 2007; Dearing, McCartney, & Taylor, 2009; Keys et al., 2013).

The present study directs attention to the remaining quality components. Structural quality is usually defined as comprising quantifiable and regulable features of the ECEC context. Whereas many studies find that lower child–staff ratios and higher or more specific teacher qualifications are associated with higher process quality, findings for other structural characteristics such as group size, space per child, availability of materials, and further training or accreditation procedures are more mixed (for a review, see Kuger, Kluczniok, Kaplan, & Rossbach, 2015). Regarding group composition, several studies document that a higher average level of peer abilities in an ECEC center is positively associated with children's cognitive and language skills (Henry & Rickman, 2007; Justice, Petscher, Schatschneider, & Mashburn, 2011; Mashburn, Justice, Downer, & Pianta, 2009). Children

learn from each other in the daily interactions and play activities in ECEC centers. A large proportion of children with non-German family language in ECEC centers has been shown to be negatively associated with German language acquisition of children with a non-German family language (Klein & Becker, 2017; Niklas, Schmiedeler, Pröstler, & Schneider, 2011). In addition, the composition of children may have indirect effects, e.g. by altering the frequency of disruptions in the class or the motivation and expectancies of teachers but to-date little empirical evidence is available on these mechanisms (Henry & Rickman, 2007).

Orientation quality comprises the education- and care-related expectations, attitudes, norms and values of all teachers in ECEC settings. How centers organize their work and assure quality (e.g., pedagogical concept) also falls into this category (Tietze et al., 2013). Orientation quality, in particular perceived responsibility, teacher enthusiasm, and joy and interest in teaching specific activities have been found to correlate with higher instructional quality (Anders & Rossbach, 2015; Kluczniok, Anders, & Ebert, 2011) and may thus influence child development.

Networking with families mainly refers to the cooperation between educators and parents (Anders & Rossbach, 2015; Kluczniok et al., 2011). Several studies have found positive associations of parent involvement in ECEC institutions with children's development (Fantuzzo, McWayne, Perry, & Childs, 2004; OECD, 2006; Zygmunt-Fillwalk, 2011). However, to-date the evidence base is stronger for characteristics of structural quality as compared to orientation quality and networking with families.

Previous Studies on Parental Choice of Qualitative Characteristics of ECEC Environments

The few existing studies on ECEC quality choices have mainly focused on overall process quality and have been mostly based on regionally restricted subsamples from the

United States and in a few cases from Germany. The overall evidence is mixed, the results depend on how ECEC quality and socio-economic status are measured and which country context is considered (e.g., Beckh, Mayer, Berkic, & Becker-Stoll, 2014; Gambaro, Stewart, & Waldfogel, 2015; Karoly, & Gonzalez, 2011; Lehl, Kuger, & Anders, 2014; Mathers et al., 2007; NICHD Early Child Care Research Network, 1997; Tietze et al., 2013). In the US, some scholars observed a U-shaped relationship between family income and some quality indicators (NICHD Early Child Care Research Network, 1997), so that the “nearly poor” group was worst off. However, children from high-income families still received the highest quality of education overall (Dowsett, Huston, Imes, & Gennetian, 2008; Phillips, Voram, Kisker, Howes, & Whitebook, 1994).

Fewer analyses have considered aspects of structural quality and composition. Using data from three US states, Bolger and Scarr (1995) detected a significant positive association of parents’ years of education and ECEC quality, measured by combining structural features and process characteristics into one factor. Parents’ occupational prestige and family income did not show an additional significant effect. Using preschool data from California, Karoly et al. (2008) did not find any significant association between the mother’s education and different indicators of structural and process characteristics of the ECEC center attended by their child. Using data on pre-K and Head Start enrollment in the US, Reid, Kagan, Hilton and Potter (2015) reported that most children attend preschools that are segregated by SES and often also by ethnicity, which may be regarded as a less beneficial learning environment. This results in an association between SES and one ECEC quality characteristic, namely group composition.

In the UK in the early 2000s, children from poorer families were more likely to access provision in state-maintained schools staffed by teachers (Mathers et al., 2007). A more recent study similarly found that children from poorer families attended more often ECEC

settings with at least one teacher or early years professional (Gambaro et al., 2015) and thus higher ECEC quality.

Based on data from two German federal states, Kuger and Kluczniok (2008) observed consistently lower process quality in ECEC groups with higher rates of migrant children despite smaller group sizes and more favorable child-teacher-ratios. Controlling for residential segregation, Becker (2010) showed for South-West Germany that highly educated and native-born parents were less likely to select an ECEC center with a high proportion of children with migration background than parents with low levels of education or with migration background. Finally, constructing a composite measure of the learning context, Biedinger, Becker and Rohling (2008) found German children to attend preschools of significantly more beneficial social composition as compared to children with migration background. We are not aware of studies investigating associations with orientation quality or networking with families.

Our study contributes to the literature by drawing on a representative sample of children across Germany and by examining whether parental choices of ECEC institutions vary systematically by SES with respect to a wide range of quality characteristics including orientation quality and networking with parents, in addition to structural quality. We further explore the importance of non-financial resources by considering potential disadvantages of single parents and differentiating between ECEC quality indicators in terms of accessibility of information. These resources may be particularly important in the German ECEC system.

The German ECEC system

ECEC in Germany is provided through a virtually universal, strongly state-subsidized system. In 2015, 33 percent of children under three and 95 percent of children aged three to five years of age attended formal ECEC services in Germany (Statistische Ämter des Bundes

und der Länder, 2015). Some German federal states and local authority districts make provision for certain groups such as single mothers in their planning of required slots, and single parents who receive welfare support are to gain prioritized access for their children aged three years and older (Spiess, Berger, & Groh-Samberg, 2008). Parents can generally choose freely between ECEC centers, as there are no designated catchment areas. On average, families in our sample lived in counties with about 1.3 ECEC centers per 100 children (SD: 0.25), while centers served strongly varying numbers of children (Mean: 82.5, SD: 45). A recent analysis found that three fourth of parents choose centers within 2.1 kilometers of their home (Stahl, 2017). Given parents' strong preference for centers close to their home, families in densely populated areas likely enjoy much greater choice than families in rural areas. For instance, an analysis based on geocodes from Berlin suggests that, in the inner city, families often have 20 and more centers at close range (Franke et al., 2015). In our K²ID survey 91% of parents reported that they had a choice between various centers (own calculations). However, families cannot rely on publicly available information on the quality of particular centers, as there are no nationwide quality seals, official websites with quality ratings or the like.

In Germany, although the federal government has legislative authority, the states and municipalities are responsible for the implementation and provision of ECEC programs. The financing costs of ECEC centers are largely covered by municipalities (about 47 percent) and by the state (about 31 percent), while parents pay on average about 14 percent (Spiess, 2008). For-profit providers play a very limited role (Spiess, 2008). Parents' fees are mostly income-dependent (Schröder, Spiess, & Storck, 2015) and relatively low compared to most other OECD countries (OECD, 2015). In 2012, they amounted on average to 144 Euros per month and family (Schröder et al., 2015). Parents generally cannot obtain higher quality by paying

higher fees, which is why positive links between family income and ECEC quality should be limited.

Minimum standards for structural quality vary considerably across federal states ('Bundesländer') and often fall short of evidence-based recommendations (NAEYC, 2014; European Commission Network on Childcare, 1996). Minimum child-teacher-ratios are regulated across all German states but the levels required for different ages vary between states (Viernickel et al., 2015). Minimum requirements for most other indicators of structural quality range from precise to very general to none at all. Most German states provide additional funding to ethnically / socially disadvantaged areas or to ECEC centers serving disadvantaged children, but the specific regulations vary across states (Hogrebe, 2014). In terms of teacher qualifications, only about five percent of staff in ECEC hold an academic degree, whereas the great majority has completed vocational training. While on average about ten percent of staff did not (yet) obtain a vocational degree at all or received a degree unrelated to ECEC, administrative records suggest that this share differs substantially between regions (Strunz, 2014). Due to decentralization, German states and municipalities vary greatly with respect to governance and funding issues as well as quality standards.

Theoretical Framework

To explore the relationship between socio-economic status of families and the quality of the ECEC center attended by the children, we draw on an investment and consumer perspective (Becker & Tomes, 1986; Blau, Ferber, & Winkler, 2002) and combine it with sociological considerations of constrained choices and accommodations (Chaudry, Henly, & Meyers, 2010; Meyers & Jordan, 2006). The basic idea of the investment perspective is that parents aim to maximize their children's economic, social and emotional wellbeing over the life course by investing in them. Choosing an ECEC institution that provides a beneficial learning environment to their child may serve as the best possible substitute for parental care

while parents go to work. However, parents face time and budget constraints and are thus restricted by practical considerations of proximity, costs, and opening hours which match parental work hours. Time and budget constraints will be particularly severe for single parents and poor families.

The economic perspective has been frequently criticized for assuming that i) parents are perfectly informed about the quality of all ECEC institutions, and ii) parents have homogeneous and relatively fixed ex-ante preferences for ECEC characteristics (Chaudry et al., 2010; Meyers & Jordan, 2006). The accommodation model seeks to combine a rational action perspective of parents with insights on varying information on the childcare system, and the role of social networks in processing information and making decisions. It suggests that parents adapt their childcare preferences based on context-specific care availability and easily accessible information. Following this model, persistent disparities in the quality of childcare across socio-economic groups may result from childcare preferences and constraints (e.g., regarding information, social networks, local childcare supply) being distributed unevenly across parents with different socio-economic resources. While the present study concentrates on relationships between quality indicators and parental background without modelling possible underlying mechanisms directly, the following section discusses different theoretical channels and the existing empirical evidence on these. These theoretical considerations support the interpretation of our results and are supposed to lay the ground for future work investigating these mechanisms empirically.

Information, Preferences and Social Networks

Families might choose ECEC institutions of different quality due to varying levels of information. Research suggests that parents' understanding of the childcare market, how to obtain a place and subsidies remains limited, especially among ethnically and linguistically

more isolated groups (Becker, 2010; Vorsanger, 2005). Also in terms of knowledge and perceptions of ECEC quality, several US studies have found significant discrepancies between parents and the care provider (Cryer & Burchinal, 1997; Helburn & Bergmann, 2002; Mocan, 2007) because it is difficult for parents to observe many qualitative features of childcare. In particular parents with higher educational attainment were found to rate the quality of their children's classrooms slightly lower and more accurately than less educated parents (Cryer, Tietze, & Wessels, 2002; Mocan, 2007). The observed differences in parents' knowledge might partly be owing to differences in their information behaviors, such as search timing and strategies and the use of different information sources. These were found to be less favorable among low-educated as well as ethnic-minority and foreign-language families in Belgium (Vandenbroeck, Visscher, & Nuffel, 2008). In Germany, Turkish parents visited on average fewer centers prior to registration than German parents (Klein, Biedinger, & Kolb, 2016).

A few US studies found that higher parental education or financial resources correlated with stronger preferences for ECEC quality criteria and less importance attached to practical concerns apart from costs (Johansen, Leibowitz, & Waite, 1996; Peyton, Jacobs, O'Brien, & Roy, 2001), whereas others did not (Cryer et al., 2002; Kensinger Rose & Elicker, 2008). In Belgium, ethnic minority parents attached less importance to the quality of the ECEC infrastructure as well as the opening hours of a center than Belgian parents (Vandenbroeck et al., 2008). In Germany, parents with college education were nearly ten percentage points more likely to report characteristics of pedagogic quality (e.g., child-teacher-ratios, pedagogical concept) as opposed to practical considerations (e.g., proximity, opening hours) as the most important criterion than those with lower levels of education (own calculations; results available from the authors upon request). Also, parents with low levels of education or German language skills were less likely to choose a (possibly higher-quality) ECEC center

other than the one closest to their home as compared to parents with higher levels of education and German language competencies (Klein et al., 2016). The authors furthermore observed that parents with migration background were more likely and native-German parents were less likely to use the nearest ECEC center if it has a large proportion of children with migration background. Among German parents, those with higher levels of education used less ethnically segregated centers than the low-educated (Becker, 2010).

Given that social networks tend to be stratified by location, race/ethnicity, and other socio-demographic characteristics (Chaudry, 2004), these factors will also shape the recommendations parents receive and subsequently their childcare preferences.

Other potential Factors influencing ECEC Choices

Other potential explanations of parents' ECEC choices, which we cannot fully consider in our data, may comprise child characteristics (e.g., linguistic competence, personality traits) which parents take into account when choosing a specific center.² Also, regional characteristics such as the local availability of ECEC quality might influence parental choices. We control for residential factors as far as possible.

Moreover, we cannot entirely rule out that ECEC centers may discriminate against particular groups. However, in our K²ID survey only seven and three percent of ECEC directors, respectively, reported as one of the top three criteria that children were selected based on a waiting list or based on talks with children and parents when applications exceeded places. For the most part, directors prioritized the oldest children, those with a sibling in the same institution and children of single or dual-earner parents (own calculations).

² The SOEP collects child-related information on health or developmental problems only in a specific mother-child-questionnaire. As a result, this information is only available for a subsample of children.

Hypotheses

Following the international evidence on socially stratified preferences and information behavior, we would expect low parental education to be negatively associated with some quality characteristics of the chosen ECEC institution (*Hypothesis 1*). Similarly, migration background is assumed to be negatively associated with quality characteristics of the chosen ECEC institution (*Hypothesis 2*). Given the relatively low and income-dependent childcare fees for the parents in Germany (see section 4), we expect few if any significant disadvantages in ECEC quality characteristics for poor households after considering parental education and migration status (*Hypothesis 3*). Single parents most likely have less time resources available to search for high-quality institutions. However, in Germany this group frequently enjoys prioritized access to childcare services and may therefore have more choice compared to couple families. As these influences possibly cancel each other out, it is a priori unclear whether we would expect a positive, negative or non-significant relationship between single parenthood and ECEC quality.

We expect potentially disadvantaged groups to experience lower ECEC quality characteristics mainly in terms of those which are easy to observe or enquire about for parents (*Hypothesis 4*). These are likely to include most structural characteristics, such as group sizes, indoor and outdoor space, equipment, and group composition. Fewer significant differences are expected for orientation quality, performed activities, and educational qualifications of pedagogic staff, which are difficult to assess for parents.

Data and Method

The analyses are based on a subsample of the German Socio-Economic Panel (SOEP), the supplementary sample Families in Germany (FiD), and an extension study (K²ID-SOEP)

which collected further information by parents and ECEC centers. The SOEP is the largest and the longest running multidisciplinary longitudinal study in Germany. In 2013, 24,113 adult members of 14,170 households participated in the study (Wagner, Frick, & Schupp, 2007). We use the 2013 SOEP wave in conjunction with the 2013 FiD wave, which can be analyzed jointly using weighting factors. The FiD study specifically surveyed families with young children and oversampled low income families, single parents, and large families. In 2013, 6,853 individuals in 3,923 households participated (Schröder, Siegers, & Spiess, 2013). In fall 2013, the K²ID-SOEP extension study (Camehl, Schober, & Spiess, 2015)³ surveyed one parent ('main caregiver', mostly the mother) of each child below school age living in a SOEP or FiD household to gather information on the ECEC center they attended, including the center address. The response rate for the additional parent questionnaire was reasonably high (about 74%). The second step was to collect indicators of various quality components directly from the director of each facility and from the main group educator of the group (i.e., classroom) attended by a SOEP/FiD child.⁴ Parents and ECEC institutions in most subsamples were surveyed between October 2013 and November 2014. 680 out of 1,244 contacted ECEC institutions (about 55%) participated in the survey. For 818 out of 857 children with information on their ECEC setting, all control variables and data on at least one of the quality characteristics of interest were available. These 818 children belonged to 699 different households and attended 749 unique groups in 647 centers from all over Germany. The average age of the children was 52 months (4.3 years) at the time of the parent survey.

We linked these household and ECEC institution data with information from further sources to enrich the set of control variables. First, the Federal Statistical Office

³ For more information on this supplementary study, see also <http://www.k2id.de>.

⁴ FiD-respondents received a long and SOEP-respondents a short version of the questionnaire by mail. In case of non-response, FiD-respondents were given the option to answer the shorter questionnaire, and for both the parent and institution surveys there was a phone follow-up with a yet shorter version of the parent questionnaire and a highly compressed version of the director questionnaire. Thus, not all quality characteristics were covered in all questionnaires.

(Regionaldatenbank Deutschland, 2016) provides figures on the supply of ECEC centers and the number of children below six for each of the over 400 German counties annually.

Administrative records of the average ECEC quality at youth welfare office district level in 2013 represent a second source of information (Strunz, 2014). These just under 600 districts show considerable overlap with German counties but some of them are even smaller in scale. Third, we used small-scale neighborhood data provided by the SOEP Group. These data can be matched with SOEP data and contain information on socio-economic neighborhood characteristics of the households (Goebel, Spiess, Witte, & Gerstenberg, 2007).

Analytical Strategy

The multivariate analyses consist of linear and (multinomial) logistic regressions of a broad range of quality indicators. For all linear regressions unstandardized coefficients are shown, although we add information on y-standardized coefficients⁵ for outcomes with scales whose interpretation is not straightforward. The coefficients of all non-linear regressions are displayed as average marginal effects (AME). Given that few children come from the same household or attend the same center (at most three and five children, respectively), the nesting of the data is limited and not explicitly accounted for in the models. However, due to the decentralized organization of ECEC and the considerably stronger nesting within counties, standard errors are clustered at county level. Sampling weights correct for selective non-response of both parents and ECEC institutions.

Quality Measures

⁵ Given the clustered structure of the data, we used federal state-specific means and standard deviations for the standardization. However, the results were mostly very similar to those from conventional y-standardization.

We examine 32 primarily structural and orientation quality indicators. Table 1 displays case numbers and summary statistics for each quality indicator, including the level of measurement (center or educator) and our theoretical classification into observable versus unobservable characteristics. The last column indicates whether a unit increase is interpreted as a rise or decrease in quality based on a summary of effects on child development found in previous studies. We rate nine indicators as easy to observe or enquire about for parents. 18 variables are continuous, 13 are binary, and one has three categories. For the purpose of data reduction, (polychoric) factor analysis was applied to quality measures with long item batteries (see Table A.1 in the appendix for details on the operationalization of these variables). While most quality indicators correlate positively with each other, these correlations rarely exceed 0.3. They tend to be slightly more strongly correlated within the same dimension (i.e., structural quality, orientation quality, or networking with families). We also tested a cluster analysis as parents may choose ECEC quality characteristics as a bundle but it was not possible to identify meaningful clusters of consistently high or low quality on multiple indicators. Most institutions performed well on a small but varying set of indicators and poorly or at mediocre levels on most other indicators.

Structural quality. One set of indicators captures the structural conditions of care, such as the number of registered children per group (group size) and per educator usually present (child-teacher-ratio), whether any of the staff members have not (yet) completed vocational training, and if the main educator attended any further training within the last 12 months. These represent fairly standard measures of ECEC quality. Additionally, we include less commonly investigated features of the structural learning environment, namely equipment with materials for school preparation and play, per-child inside and garden space, the number of special-purpose rooms (e.g. gyms), the frequency of performed or offered

activities in the group, and the center-level diversity of offered activities. The latter is a dummy variable which indicates if the center scores in the highest quintile concerning number of different learning opportunities offered to children (e.g., early musical or foreign language education, trips to the library, museum, theatre, etc.). Lastly, a binary variable specifies if the ECEC group consists of at least 30 percent of children with a foreign language of origin.

Orientation quality. Orientation quality at center level measures the degree of coordination and quality assurance/development. Two dummy variables indicate if the curricular guidelines of the specific federal state ('Bildungspläne') strongly influence daily work at the ECEC center (i.e., median or above-median rating of influence by group educator), and if any internal or external measures intended to improve quality were conducted within the past 12 months. This category furthermore comprises four categorical variables signifying whether the institution has a written pedagogical concept⁶, whether the team has participated in developing the concept, whether a recently conducted activity or project has been documented by the group to make children reflect on this experience (e.g., by creating a poster), and how regularly the team meets.

Group educators' orientations are measured through several indicators capturing satisfaction with the center, work motivation, enjoyment of domain-specific activities, perceptions of educator roles and responsibilities as well as educational goals. The first indicator captures satisfaction with the center (11-point scale from 0 "completely dissatisfied" to 10 "completely satisfied"). A dummy variable differentiates whether the

⁶ ECEC centers are required to have a written pedagogical concept, i.e., a document that is binding and informs ECEC staff and parents about the setting's pedagogical orientation, work and objectives. It is also supposed to ensure centers' quality development.

educator's work motivation is at or above median level⁷ (for details see Schaufeli, Bakker, & Salanova, 2006). Two factors capture educators' personal enjoyment of implementing the dimensions of social pedagogy and math/science into every-day practice. Next to individual satisfaction and enthusiasm, we investigate perceptions of their personal role towards children as experts and partners (median or above-median ratings) (Kuger & Kluczniok, 2008), respectively, and of the center's responsibility relative to the child's family in terms of promoting children's motor/cognitive and social competences.⁸ Additionally, two variables assess the importance educators attach to two educational goals, that is fostering children's conformity and autonomy.

Networking with families. We cover part of the networking dimension by considering i) a summary index of parents' influence on an 11-point scale on five different aspects of care, and ii) whether parents have participated in writing up the pedagogical concept. These are based on reports by the ECEC directors.

Potentially Disadvantaged Groups

As a first characteristic of family socio-economic status, we consider the educational attainment of the main caregiver, which distinguishes three levels based on the CASMIN classification: low (0-1c), medium (2a-2c), and high (3a-3b). Second, a binary variable termed "migration background" draws on individuals' country of birth and indicates if the child or one of his/her parents immigrated to Germany. The third variable specifies whether the net equivalized, inflation-adjusted household income (OECD, 2013) falls below the

⁷ Averaged rating of how often a) educators are enthusiastic about their job, b) their job inspires them, and c) they are proud of the work they do.

⁸ We applied factor analysis to combine educators' assessment as to whether the family or ECEC center should primarily promote children's skills in different domains into one factor. Respondents could reply on a 7-point scale ranging from 1 "only the family" to 7 "only the center".

poverty line of 833€, defined as 60% of the median of the monthly net household income in 2013 (SOEP Group, 2015). The last key independent variable marks children who live with a single parent (see Table A.2 for further details on all key independent variables). Even though the different variables are partly correlated with each other, these correlations are moderate at most. For example, not even half of caregivers of the children in households with incomes below the poverty line have a low level of education; the majority of these children's caregivers hold a medium educational qualification.

Control Variables

All models incorporate diverse *individual, household and regional characteristics* (see Table A.2 for summary statistics). In addition to considering dummy variables for the child's age at the time of the parent survey, we control for whether the child started attending the center before the third birthday. Families with more educated parents use ECEC institutions from an earlier age but at the same time childcare availability for children below age three is more restricted than for older children, for which parents will have more choice between different institutions. We also consider if the child entered the center more than 12 months ago, as a longer period increases the risk that some quality characteristics may have changed compared to the time when parents made the decision. Two variables capture the number of children up to 16 years in the household and if an older sibling is also attending an ECEC institution, which may mean that parents are more experienced and informed about ECEC quality. However, they might also be more inclined to choose the same ECEC setting as for the older child just for the sake of convenience. We further include the mother's age and employment, differentiating between long part-time or full-time work (>25 hours/week), short part-time work (≤25 hours/week), and no employment. Mothers' employment correlates

with education and may reduce parents' time resources; it might however also increase their motivation to find high-quality ECEC institutions.

We further control for several features of the ECEC center parents may base their choices on and which also happen to correlate with quality indicators (e.g., group size, different types of activities offered, number of special-purpose rooms). A categorical variable indicates whether or not the attended center serves children below age three, or if this information is missing. To save as many observations as possible, the sample incorporates children attending ECEC settings with an open group structure⁹, but this aspect is controlled for. For relevant outcomes, we also control for the number of children attending the center.

Features of the regional context may be relevant for the supply of childcare quality in families' close environment. Given our interest in parental choices net of such contextual factors, we control for the household's location in East Germany and in a small (<20,000 inhabitants), medium (20,000 to 500,000 inhabitants), or large town (>500,000 inhabitants). To characterize families' immediate neighborhoods, we consider the mean-centered average household purchasing power index in the street section where the household lives, and the number of migrant households at residential block level when analyzing group composition.

Given the substantial, systematic regional variation in quantitative and qualitative ECEC supply, all models include the county-level number of ECEC centers per 100 children below six years for the year the child entered the center. This serves as a proxy for parents' degree of choice among different centers. Moreover, to match the respective dependent variables on structural quality, we control for the mean-centered average of group size, child-teacher-ratio, proportion of staff with specialized vocational or university training, and proportion of foreign-origin children aged three to five in ECEC at the youth welfare office

⁹ This means that instead of assigning children to different classrooms, all children in a center can play together and are taken care of by all educators.

district level. Finally, we include dummy variables for missing information on these regional quality levels, on the number of migrant households in the residential block, or on maternal working hours, respectively.

Results

Parental Education and ECEC Quality

Table 2 shows the results for all structural quality indicators revealing any significant associations with our defined groups of being potentially disadvantaged.¹⁰ Children with a main caregiver with a medium level of education attended ECEC groups in which educators looked after one child less on average than children with a low-educated parent. The coefficient for children with a college-educated parent was also negative but smaller and did not reach statistical significance. These children were, however, 19 percentage points more likely to attend an ECEC group whose educator received some further training within the past year.

Furthermore, medium or high educational achievement of the main caregiver also went along with greater availability of materials for school preparation, with y -standardized coefficients amounting to around 30 percent of a standard deviation (SD). Garden space available to children with medium- and high-educated parents furthermore exceeded space for children with low-educated parents by roughly six m² per child. Finally, looking at group composition, the findings provided strong evidence of segregation: Even after controlling for the district-average share of migrant children in ECEC and the number of migrant households in the family's residential block, having a parent with a medium or high level of education

¹⁰ Models with no significant results are available from the authors upon request.

reduced the probability of attending ECEC groups with a high proportion of migrants (i.e., ≥ 30 percent) by 10 and 17 percentage points, respectively.

Turning to indicators of orientation quality at center level in Table 3, children of parents with a university degree were more often enrolled in centers applying internal or external measures of quality improvement and less frequently in settings whose team members only met every other week. The differences in probabilities compared to children of low-educated parents were considerable for both outcomes (17 and 22 percentage points, respectively).

The only significant association indicating less favorable orientation quality at educator level for children of low caregiver education was that children whose parents held a university degree had a nearly 20 percentage points greater chance to be cared for by a highly motivated group educator (Table 4). By contrast, children of parents with low educational attainment attended settings offering more frequent artistic and playful activities, and the pedagogical work was more strongly influenced by curricular guidelines. Furthermore, the educators reported enjoying math/science more and attributed more responsibility to the center for promoting children's cognitive and motor skills rather than the family, while they were less prone to consider themselves experts towards the children.

Overall, these findings provide some evidence in line with *Hypothesis 1*, as higher parental education was partly linked to significantly better ECEC quality in terms of five structural and three orientation characteristics.

Migration Background and ECEC Quality

As shown in Table 2, children with migration background attended ECEC groups which served about three children more as compared to groups attended by non-migrant children. Similar to children whose caregivers had low levels of education, their institutions

offered about 4.5 m² less garden space to each registered child. They were also 11 percentage points more likely to be cared for in groups with high shares of children who speak a foreign language at home, despite holding parental education and other control variables constant.

In terms of orientation quality, children with migration background were 11 percentage points less likely to attend centers applying procedures to enhance quality (Table 3) and the group educators caring for these children were significantly less satisfied with the institutions they work for (Table 4). However, the latter correlation was only moderate in size, amounting to .22 of a SD. As opposed to this, children with migration background performed artistic and playful activities more frequently, and their educators were less likely to report feeling like experts.

In sum, the results provided some support for *Hypothesis 2* which assumed that migration background was negatively associated with some quality characteristics of the ECEC facility the child attended. We found corresponding links for three structural and two orientation quality indicators.

Poverty and ECEC Quality

Table 2 suggests that, if anything, living in a poor household partly correlated *positively* with structural ECEC quality. Advantages prevailed for these children in terms of fewer unqualified staff, larger interior and garden space, more artistic activities and games, and educators' greater enjoyment of integrating social-pedagogical themes into their work. Generally, the estimates revealed few signs of disadvantage encountered by this group with regard to diverse ECEC quality indicators. One exception was that low-income parents appeared to have less of a say in the center's pedagogical concept (Table 3). The difference in probabilities compared to non-poor households was 16 percentage points. Moreover, children from poor households were attending ECEC groups with on average less satisfied and less

motivated staff (Table 4). The difference in group educators' satisfaction with the institution was large approaching 60 percent of a SD. Also, children from poor families were 17 percentage points less likely to attend a setting with a highly motivated group educator.

The disadvantage experienced by children from poor households was hence limited to three indicators of educator orientation and networking with families. On the whole, these results were thus in line with *Hypothesis 3* which postulated that poverty is barely associated with lower ECEC quality.

Single Parenthood and ECEC Quality

Children who lived with one parent in the household had a 24 percentage points higher propensity of attending an ECEC group that deployed one or more educators without completed vocational training (Table 2). This association was highly significant. In respect to orientation quality the results showed that those educators serving children of single parents were more inclined to attribute responsibility for fostering children's skills to the family as opposed to the center (Table 4). This held particularly true for the domain of cognitive and motor abilities, with effect sizes exceeding .8 of a standard deviation, but it also applied to promoting children's social skills (.26 of a SD). Children of single parents were also enrolled in centers that considered parental wishes and suggestions to a lesser extent (Table 3). The coefficient was again highly significant and, drawing on y-standardized results, can be considered large. At the same time, educators in ECEC groups of children of single parents were more motivated, more likely to receive further training and to have more regular team meetings.

On the whole, these findings suggest that children of single parents face some disadvantages with respect to four quality indicators, but also some advantages.

ECEC Quality Differences and Observability of Indicators

Children with a low-educated main caregiver attended lower-quality ECEC institutions with respect to four out of nine primarily structural quality indicators which we rated as observable and with respect to four out of 23 hardly observable indicators. In other words, this group faced systematic disadvantages on about half of all observable and only one fifth of all unobservable quality indicators. Likewise, considering migration background the respective figures were about a third of all observable and just two out of 23 unobservable indicators. For none of the observable characteristics did we find evidence that children from poor or single-parent families attended systematically lower quality settings. Disadvantages experienced by these groups only became evident on three and four quality indicators which we categorized as difficult to observe or enquire about for parents, respectively. Our findings therefore provide evidence for *Hypothesis 4*, according to which potentially disadvantaged groups experience lower quality mainly regarding easily observable features, only for parental education and migration background.

The observed patterns are notable and may indicate moderate differences in parents' choices depending on their education and migration background. However, in terms of possible inequalities in children's educational opportunities, it is crucial to consider how important, based on previous studies, the indicators on which we found systematic differences might be for child development. For children with low-educated parents and with migration background, the differences related in part to frequently examined, well-established and rather holistic characteristics of the ECEC environment. Most importantly, they referred to staffing, quality development, group composition and educators' overall orientation. On the contrary, we observed advantages for these two groups mainly regarding less-established and domain-specific variables, such as if the educator feels like an expert or the frequency of artistic activities and games which are conducted in virtually all ECEC settings.

Concerning poverty and single parenthood, disadvantages emerged on a few characteristics of parental involvement and educator orientation, where to-date we know less as to how these relate to child development. Regarding staff education, a frequently examined and well-established quality indicator, we found that children of single parents were more likely to attend ECEC groups with staff who had not yet completed their training but who had participated in further training in the past year. Children from poor families were *less often* cared for by unqualified staff.

Sensitivity Analyses

To verify the robustness of our results, we conducted several sensitivity tests. The majority of relationships with observable indicators became stronger and more significant when excluding children from small municipalities, where parents' degree of choice should be rather limited. For unobservable quality indicators changes were more mixed. Furthermore, we replaced the county-level number of centers per 100 children by the year-specific childcare attendance rates for children below or above three, depending on the child's year and age of entry. The conclusions were very similar.

In terms of operationalization of group composition, we tested various thresholds. Children with low-educated parents were significantly more likely to attend groups with at least 15, 20, 25, 35, or 40 percent of foreign-language children compared to one or both of the groups with higher levels of education. Likewise, children with migration background revealed significantly higher propensities when the threshold was 15, 20 or 25 instead of 30, respectively. Comparable results were also obtained in a linear regression of the continuous proportion of migrant children. Tests with a variable defining migration background more narrowly showed that several of the disadvantages reported for migrant children were primarily driven by families in which all parents in the household have a migration

background. Lastly, the advantages observed for children of parents with medium or high levels of education were mostly similar when using maternal CASMIN or highest parental CASMIN.¹¹

To examine the risk of multicollinearity among the variables capturing parental education, migration background, poverty status and single parenthood, we compared the full models with stepwise models including the potentially disadvantaged groups one after the other, and with models excluding the control for maternal employment. Most estimates were very robust, with the exception of garden size and centers' implementation of quality improvement measures, which should be treated with caution.

Finally, false discovery rate corrections adjusting p-values for multiple inference were applied to highly similar outcome variables (e.g., materials, perceptions of center's role). These underlined that the marginally significant associations ($p < .10$) are generally less trustworthy compared to those with $p < .05$.

Discussion

Using nationally representative household data supplemented with direct information from the ECEC institutions which the child attended, this study represents the most rigorous examination of associations between family background and characteristics of ECEC quality in Germany to-date. The analyses provide some evidence for moderate associations in the expected direction disadvantaging children with migration background and especially those with a low-educated main caregiver. These children experience significantly lower levels of quality on a limited set of structural indicators (i.e., further training of staff, garden space and equipment, group composition) and orientation characteristics (i.e., frequency of team

¹¹ Substituting poverty with a continuous measure of household income, the associations for staff satisfaction and parental involvement in the pedagogical concept ceased to be significant.

meetings, staff motivation and satisfaction), some of which are established quality characteristics that have recurrently been shown to correlate with process quality and child development. By contrast, few significant disadvantages emerged for children from poor or single parent households which mostly related to educators' orientation and aspects of networking with families. For these two groups it is questionable whether it is at all justified to speak of a real disadvantage in light of the few differences, especially since some relationships with characteristics of teacher qualification rather point in the opposite direction. More research on the significance of educators' orientations and parental involvement for child development may help arrive at a more definitive answer.

Following the accommodation model (Meyers & Jordan, 2006), this study incorporated several family background variables and distinguished ECEC quality indicators which are easy or difficult to observe for parents to shed some light on how time and budget constraints and parental characteristics such as knowledge, preferences, or networks may mediate/moderate links between family SES and ECEC quality. Part of the disadvantages found for children with low-educated parents and migration background, respectively, related to observable indicators. This may suggest that in Germany, parental characteristics such as knowledge, preferences, or networks rather than financial resources might matter in the choice process. At the very least, we can neither rule out that more advantaged groups intentionally choose better-equipped settings (e.g., due to greater knowledge of the importance of ECEC quality for child development), nor that stratified preferences or networks result in families with migration background favoring more culturally/ethnically mixed ECEC institutions and in non-migrant families avoiding them. One explanation for the significant associations with quality indicators rated as less observable may be that when choosing a center parents might not take into account the investigated features at all, but rather pay attention to other aspects which happen to correlate with these features, including

provider type or specific pedagogical approaches. Alternatively, we cannot rule out that center directors may discriminate against some groups or that more privileged social groups gain more information also about aspects which are difficult to observe through recommendations in their larger social networks or through interactions with the staff before choosing the center.

The complete lack of relationships between both poverty and single parenthood with lower quality in terms of observable indicators supports our expectations. Being poor does not per se prevent access to care of high structural quality in a highly subsidized ECEC system, even in the absence of targeted programs such as Head Start in Germany. Likewise, while single parents might face greater time and budget constraints in finding high-quality care, this may be offset by their prioritized access to ECEC slots in many places. These findings may imply that in general governments which remove financial access barriers to ECEC, e.g., by strongly subsidizing it, may protect some groups of children from experiencing further disadvantage regarding the quality of early education and care provision.

Overall, the presented evidence on associations between family background characteristics and ECEC quality in Germany provides some indication of modestly unequal educational opportunities faced by children from low-educated and migrant backgrounds early in the life course. Importantly, this adds to the pronounced discrepancies in ECEC use between education groups at earlier ages (Stahl & Schober, 2017). Possibly, the longer exposure to high-quality early learning and care environments of children from more educated, non-migrant families interferes with a potential compensatory function of ECEC which is thought to reduce the gaps in children's school readiness. Inequalities in length of attendance and ECEC quality are pathways through which (dis)advantage may be transmitted between generations, thereby nurturing the social reproduction of inequality. A particularly consistent finding is that children with a low-educated main caregiver and with migration

background are considerably more likely to attend ECEC settings with high shares of children with a foreign language of origin even after accounting for a large set of socio-demographic and residential controls. This result confirms earlier findings (Becker, 2010) and therefore deserves greater scientific and political attention in light of studies emphasizing the significance of group composition for process quality and child development.

The present study makes an important contribution by applying a sociological investment and accommodation perspective to parental choices of ECEC quality and by considering a large number of quality characteristics and distinguishing between different levels of observability. We also consider more in detail than previous studies how the policy context in terms of access to a place and other context specific regulations may impact the options faced by different socio-economic groups. Yet the study has several limitations. ECEC quality was measured after the child's entry into the center. However, the quality at the time of measurement might differ from that at the time parents made the choice. Although survey responses of ECEC personnel might be biased due to social desirability, this is likely to be relatively similar across institutions and stable over time.

As a further limitation, roughly 10 percent of parents in our sample said that they did not have a choice between different institutions due to lack of availability. Although we included a number of residential controls in the models, these might not perfectly capture the availability of places or quality around a family's home. Also owing to data limitations, the models neglect centers' freedom to accept or reject individual children. Finally, our categorizations of quality characteristics according to different levels of observability are conceptually driven and will require further examination in future empirical studies.

A promising avenue for future studies would be to investigate in more detail the process of parents searching for and choosing an ECEC institution and to test whether the theoretically suggested factors (e.g., knowledge, preferences) underlie the observed

relationships between ECEC quality, parental education and migration background. This would also be highly relevant to practitioners, as a better understanding of these processes might improve the interaction of ECEC educators and parents both before and after parents choose a particular ECEC institution.

In terms of policy implications, several approaches may be considered to tackle the lack of transparency regarding the quality of individual institutions and to set incentives to improve quality. One option would be to provide parents with educational opportunities to acquire information on ECEC quality. However, different groups of parents might vary in terms of motivation to participate, and they might face varying constraints in applying this knowledge. Another approach would be to implement incentives at the institutional level to ensure ECEC quality, for example by making at least some of the ECEC funding conditional on quality evaluations, as has been done in some German states. These external quality assessments can be made available to parents, for instance through a system of quality seals (Spiess & Tietze, 2002). One concrete example might be the implementation of Quality Rating and Improvement Systems (QRIS) that are increasingly deployed by US states to monitor and improve the quality of ECEC settings (e.g. Goffin & Barnett, 2015). The idea is to make information on program quality accessible to the public, and to alter parental preferences for quality-related attributes and encourage competition between providers. However, first evidence on this is mixed. Although QRIS induces families to shift from parental to non-parental care, economically disadvantaged families are more likely to use informal care (Herbst, 2016). Evaluations also showed that only some dimensions of quality are superior for more highly rated programs. In addition, recent analyses showed at most weak relationships with some child outcomes (e.g., Karoly, Schwartz, Setodji, & Haas, 2016).

In view of our findings and these experiences with QRIS systems in the US, great caution must be exercised in designing such measures. Depending on their complexity and accessibility, providing such information may boost the observed relationships further if higher-educated, non-migrant parents are more likely or better able to utilize them. Therefore, in addition, tighter quality regulations and reimbursement for higher ECEC quality may help to counteract early institutional disadvantage for children who would otherwise receive care of below-average quality. They could either aim at raising the average level of ECEC quality in general and reducing variation in quality across settings, or follow a targeted approach that positively discriminates potentially disadvantaged groups of children. Mostly likely, a combination of several approaches that include parents, practitioners in the early childhood education field as well as policy makers (e.g., Cryer et al., 2002) are best suited to ensure that children experience high ECEC quality.

References

- Anders, Y., & Rossbach, H.G. (2015). Preschool teachers' sensitivity to mathematics in children's play: The influence of math-related school experiences, emotional attitudes, and pedagogical beliefs. *Journal of Research in Childhood Education*, 29(3), 305-322. doi: 10.1080/02568543.2015.1040564
- Anders, Y., Rossbach, H. G., Weinert, S., Ebert, S., Kuger, S., Lehrl, S., & von Maurice, J. (2012). Home and preschool learning environments and their relations to the development of early numeracy skills. *Early Childhood Research Quarterly*, 27(2), 231-244. doi: 10.1016/j.ecresq.2011.08.003
- Bainbridge, J., Meyers, M. K., Tanaka, S., & Waldfogel, J. (2005). Who gets an early education? Family income and the enrollment of three- to five-year-olds from 1968 to 2000. *Social Science Quarterly*, 86(3), 724-745. doi: 10.1111/j.0038-4941.2005.00326.x
- Becker, B. (2010). Ethnische Unterschiede bei der Kindergartenselektion: Die Wahl von unterschiedlich stark segregierten Kindergärten in deutschen und türkischen Familien. In B. Becker & D. Reimer (Eds.), *Vom Kindergarten bis zur Hochschule. Die Generierung von ethnischen und sozialen Disparitäten in der Bildungsbiographie* (pp. 17-47). Wiesbaden: VS Verlag für Sozialwissenschaften. doi: 10.1007/978-3-531-92105-1_2
- Becker, G. S., & Tomes, N. (1986). Human capital and the rise and fall of families. *Journal of Labor Economics*, 4(3, Part 2), 1-39. doi: 10.1086/298118
- Beckh, K., Mayer, D., Berkic, J., & Becker-Stoll, F. (2014). Der Einfluss der Einrichtungsqualität auf die sprachliche und sozial-emotionale Entwicklung von Kindern mit und ohne Migrationshintergrund. *Frühe Bildung*, 3, 73-81. doi: 10.1026/2191-9186/a000150

- Belsky, J., Vandell, D., Burchinal, M., Clarke-Stewart, K. A., McCartney, K., Owen, M., & the NICHD Early Child Care Research Network. (2007). Are there long-term effects of early child care? *Child Development, 78*(2), 681-701. doi: 10.1111/j.1467-8624.2007.01021.x
- Biedinger, N., Becker, B., & Rohling, I. (2008). Early ethnic educational inequality: The influence of duration of preschool attendance and social composition. *European Sociological Review, 24*(2), 243-256. doi: 10.1093/esr/jcn001
- Blau, F. D., Ferber, M. A., & Winkler, A. E. (2002). *The economics of women, men, and work*. Upper Saddle River, NJ: Prentice-Hall.
- Bolger, K. E., & Scarr, S. (1995). Not so far from home: How family characteristics predict child care quality. *Early Development and Parenting, 4*(3), 103-112. doi: 10.1002/edp.2430040303
- Burger, K. (2010). How does early childhood care and education affect cognitive development? An international review of the effects of early intervention for children from different social backgrounds. *Early Childhood Research Quarterly, 25*(2), 140-165. doi: 10.1016/j.ecresq.2009.11.001
- Camehl, G. F., Schober, P. S., & Spiess, C. K. (2015). A SOEP-Related study: Early childhood education and care quality in the Socio-Economic Panel (K2ID-SOEP). In S. Gerstorff & J. Schupp (Eds.), *SOEP Wave Report 2014* (pp. 31-34). Berlin: DIW Berlin / SOEP.
- Chaudry, A. (2004). *Putting children first: How low-wage working mothers manage child care*. New York: Russell Sage Foundation.
- Chaudry, A., Henly, J., & Meyers, M. (2010). ACF-OPRE white paper. Conceptual frameworks for child care decision-making. In Washington, DC: Office of Planning, Research and Evaluation, *Administration for Children and Families*, U.S. Department of Health and Human Services. Retrieved from <http://www.eric.ed.gov>

- Cryer, D., & Burchinal, M. (1997). Parents as child care consumers. *Early Childhood Research Quarterly, 12*(1), 35-58. doi: 10.1016/S0885-2006(97)90042-9
- Cryer, D., Tietze, W., & Wessels, H. (2002). Parents' perceptions of their children's child care: A cross-national comparison. *Early Childhood Research Quarterly, 17*, 259-277. doi: 10.1016/S0885-2006(02)00148-5
- Dearing, E., McCartney, K., & Taylor, B. A. (2009). Does higher quality early child care promote low-income children's math and reading achievement in middle childhood? *Child Development, 80*(5), 1329-1349. doi: .1111/j.1467-8624.2009.01336.x
- Dowsett, C. J., Huston, A. C., Imes, A. E., & Gennetian, L. (2008). Structural and process features in three types of child care for children from high and low income families. *Early Childhood Research Quarterly, 23*(1), 69-93. doi: 10.1016/j.ecresq.2007.06.003
- European Commission Network on Childcare and Other Measures to Reconcile the Employment and Family Responsibilities of Men and Women. (1996). Quality targets in services for young children. Proposals for a ten year action programme. Retrieved from <http://www.childcarecanada.org/sites/default/files/Qualitypaperthree.pdf>
- Fantuzzo, J., McWayne, C., Perry, M. A., & Childs, S. (2004). Multiple dimensions of family involvement and their relations to behavioral and learning competencies for urban, low-income children. *School Psychology Review, 33*(4), 467-480.
- Franke, C., Pieper, J., Kürten, C., & Schweikart, J. (2015). GIS-gestützte kleinräumige Kita-Versorgungsanalyse am Beispiel von Berlin-Pankow. In J. Strobl, T. Blaschke & G. Griesebner (Eds.), *Angewandte Geoinformatik 2015. Beiträge zum 27. AGIT-Symposium Salzburg* (pp. 18–27). Heidelberg: Wichmann.
- Gambaro, L., Stewart, K., & Waldfogel, J. (2015). A question of quality: Do children from disadvantaged backgrounds receive lower quality early years education and care in England? *British Educational Research Journal, 41*(4), 553-574. doi: 10.1002/berj.3161

- Goebel, J., Spiess, C. K., Witte, N. R. J., & Gerstenberg, S. (2007). Die Verknüpfung des SOEP mit MICROM-Indikatoren: Der MICROM-SOEP Datensatz. In *Data Documentation 26*: DIW Berlin.
- Goffin, S. G., & Barnett, W. S. (2015). Assessing QRIS as a change agent. *Early Childhood Research Quarterly, 30*(Part B), 179–182. doi: 10.1016/j.ecresq.2014.08.005
- Gormley, W. T., Jr., Phillips, D., & Gayer, T. (2008). Preschool programs can boost school readiness. *Science, 320*, 1723-1724. doi: 10.1126/science.1156019
- Helburn, S., & Bergmann, B. R. (2002). *America's childcare problem: The way out*. New York: Palgrave Press. Retrieved from <http://www.eric.ed.gov>
- Henry, G. T., & Rickman, D. K. (2007). Do peers influence children's skill development in preschool? *Economics of Education Review, 26*(1), 100-112. doi: 10.1016/j.econedurev.2005.09.006
- Herbst, C. (2016). The impact of quality rating and improvement systems on families' child care choices and the supply of child care labor. IZA DP No. 10383. Available at SSRN: <https://ssrn.com/abstract=2879790>
- Hogrebe, N. (2014). *Bildungsfinanzierung und Bildungsgerechtigkeit. Der Sozialraum als Indikator für eine bedarfsgerechte Finanzierung von Kindertageseinrichtungen?* (Educational Governance Band 24). Wiesbaden: Springer VS. doi: 10.1007/978-3-658-03489-4
- Johansen, A., Leibowitz, A., & Waite, L. J. (1996). The importance of child-care characteristics to choice of care. *Journal of Marriage and the Family, 58*(3), 759-772. doi: 10.2307/353734
- Justice, L. M., Petscher, Y., Schatschneider, C., & Mashburn, A. (2011). Peer effects in preschool classrooms: Is children's language growth associated with their classmates' skills? *Child Development, 82*, 1768-1777. doi: 10.1111/j.1467-8624.2011.01665.x

- Karoly, L. A., Ghosh-Dastidar, B., Zellman, G. L., Perlman, M., & Fernyhough, L. (2008). *Prepared to learn: The nature and quality of early care and education for preschool-age children in California*. Santa Monica, CA: RAND Corporation. Retrieved from: https://www.rand.org/pubs/technical_reports/TR539.html.
- Karoly, L. A., & Gonzalez, G. C. (2011). Early care and education for children in immigrant families. *The Future of Children*, 21(1), 71-101. doi: 10.1353/foc.2011.0005
- Karoly, L. A., Schwartz, H. L., Setodji, C. M., & Haas, A. C. (2016). *Evaluation of Delaware stars for early success: Final report*. Santa Monica, CA: RAND Corporation. doi: 10.7249/RR1426
- Kensinger Rose, K., & Elicker, J. (2008). Parental decision making about child care. *Journal of Family Issues*, 29(2), 1161-1184. doi: 10.1177/0192513X07312103
- Keys, T. D., Farkas, G., Burchinal, M. R., Duncan, G. J., Vandell, D. L., Li, W., ... & Howes, C. (2013). Preschool center quality and school readiness: Quality effects and variation by demographic and child characteristics. *Child Development*, 84(4), 1171-1190. doi: 10.1111/cdev.12048
- Klein, O. & Becker, B. (2017).: Preschools as language learning environments for children of immigrants. Differential effects by familial language use across different preschool contexts. *Research in Social Stratification and Mobility*, 48, 20-31. doi: 10.1016/j.rssm.2017.01.001
- Klein, O., Biedinger, N., & Kolb, J.-P. (2016). Ethnische Unterschiede bei der Wahl des Kindergartens: Wer wählt den nächstgelegenen Kindergarten? *Paper presented at 2016 Meeting of the Society of Empirical Educational Research*.
- Kluczniok, K., Anders, Y., & Ebert, S. (2011). Fördereinstellungen von Erzieherinnen. Einflüsse auf die Gestaltung von Lerngelegenheiten im Kindergarten und die kindliche Entwicklung früher numerischer Kompetenzen. *Frühe Bildung*, 0, 13-21. doi: 10.1026/2191-9186/a000002

- Kluczniok, K., & Roßbach, H.-G. (2014). Conceptions of educational quality for kindergartens. *Zeitschrift für Erziehungswissenschaft*, *17*(6), 145–158. doi: 10.1007/s11618-014-0578-2
- Kuger, S., & Kluczniok, K. (2008). Prozessqualität im Kindergarten - Konzept, Umsetzung und Befunde. *Zeitschrift für Erziehungswissenschaft, Sonderheft 11/2008*, 159-178. doi: 10.1007/978-3-531-91452-7_11
- Kuger, S., Kluczniok, K., Kaplan, D., & Rossbach, H. G. (2016). Stability and patterns of classroom quality in German early childhood education and care. *School Effectiveness and School Improvement: An International Journal of Research, Policy and Practice*, *27*(3), 418-440. doi: 10.1080/09243453.2015.1112815
- Lehrl, S., Kuger, S., & Anders, Y. (2014). Soziale Disparitäten beim Zugang zu Kindergartenqualität und differenzielle Konsequenzen für die vorschulische mathematische Entwicklung. *Unterrichtswissenschaft*, *42*, 132-151. doi: 10.3262/UW1402132
- Liang, X., Fuller, B., & Singer, J. D. (2000). Ethnic differences in child care selection: The influence of family structure, parental practices, and home language. *Early Childhood Research Quarterly*, *15*(3), 357-384. doi: 10.1016/S0885-2006(00)00071-5
- Mashburn, A. J., Justice, L. M., Downer, J. T., & Pianta, R. C. (2009). Peer effects on children's language achievement during pre-kindergarten. *Child Development*, *80*(3), 686-702. doi: 10.1111/j.1467-8624.2009.01291.x
- Mathers, S., Sylva, K., Joshi, H., Hansen, K., Plewis, I., Johnson, J., George, A., Linskey, F., & Grabbe, Y. (2007). *Quality of childcare settings in the millennium cohort study*. London: DfES
- Meyers, M. K., & Jordan, L. P. (2006). Choice and accommodation in parental child care decisions. *Community Development* *37*(2), 53-70. doi: 10.1080/15575330609490207

- Mocan, N. (2007). Can consumers detect lemons? An empirical analysis of information asymmetry in the market for child care. *Journal of Population Economics*, 20(4), 743-780. doi: 10.1007/s00148-006-0087-6
- National Association for the Education of Young Children (NAEYC). (2014). NAEYC early childhood program standards and accreditation criteria & guidance for assessment. Retrieved from <http://www.naeyc.org/files/academy/file/AllCriteriaDocument.pdf>
- NICHD Early Child Care Research Network. (1997). Familial factors associated with the characteristics of nonmaternal care for infants. *Journal of Marriage and the Family*, 59, 389-408. doi: 10.2307/353478
- NICHD Early Child Care Research Network. (2002). Child-care structure → Process → Outcome: Direct and indirect effects of child-care quality on young children's development. *Psychological Science*, 13(3), 199-206. doi: 10.1111/1467-9280.00438
- Niklas, F., Schmiedeler, S., Pröstler, N., & Schneider, W. (2011). Die Bedeutung des Migrationshintergrunds, des Kindergartenbesuchs sowie der Zusammensetzung der Kindergartengruppe für sprachliche Leistungen von Vorschulkindern. *Zeitschrift für Pädagogische Psychologie*, 25(2), 115-130. doi: 10.1024/1010-0652/a000032
- Organisation for Economic Co-operation and Development. (2006). *Starting strong II - early childhood education and care*. Paris: OECD Publishing.
- Organisation for Economic Co-operation and Development. (2013). Framework for integrated analysis. In *OECD Framework for Statistics on the Distribution of Household Income, Consumption and Wealth*. OECD Publishing. doi:10.1787/9789264194830-11-en
- Organisation for Economic Co-operation and Development. (2015). Structural policy indicators. In *Economic Policy Reforms 2015 - Going for Growth*. Paris: OECD Publishing. doi: 10.1787/growth-2015-51-en

- Peyton, V., Jacobs, A., O'Brien, M., & Roy, C. (2001). Reasons for choosing child care: associations with family factors, quality, and satisfaction. *Early Childhood Research Quarterly, 16*(2), 191-208. doi: 10.1016/S0885-2006(01)00098-9
- Phillips, D. A., Voram, M., Kisker, E., Howes, C., & Whitebook, M. (1994). Child care for children in poverty: Opportunity or inequality? *Child Development, 65*(2), 472-492. doi: 10.2307/1131397
- Regionaldatenbank Deutschland. (2016). Statistik der Tageseinrichtungen für Kinder, 2008-2014. Retrieved from: <https://www.regionalstatistik.de>
- Reid, J. L., Kagan, S. L., Hilton, M., & Potter, H. (2015). *A better start: Why classroom diversity matters in early education*. New York: The Century Foundation and the Poverty & Race Research Action Council.
- Reid, J. L., & Ready, D. D. (2013). High-quality preschool: The socioeconomic composition of preschool classrooms and children's learning. *Early Education & Development, 24*(8), 1082-1111. doi: 10.1080/10409289.2012.757519
- Schaufeli, W. B., Bakker, A. B., & Salanova, M. (2006). The measurement of work engagement with a short questionnaire: A cross-national study. *Educational and Psychological Measurement, 66*(4), 701-716. doi: 10.1177/0013164405282471
- Schober, P. S., & Spiess, C. K. (2013). Early childhood education activities and care arrangements of disadvantaged children in Germany. *Child Indicators Research, 6*(4), 709-735. doi: 10.1007/s12187-013-9191-9
- Schröder, C., Spiess, C. K., & Storck, J. (2015). Private spending on children's education: Low-income families pay relatively more. In *DIW Economic Bulletin, 8*, 113-123. Retrieved from: <http://hdl.handle.net/10419/107604>
- Schröder, M., Siegers, R., & Spiess, C. K. (2013). "Familien in Deutschland" – FiD. *Schmollers Jahrbuch/ Journal of Applied Social Science Studies, 133*(4), 595-606. doi: 10.3790/schm.133.4.595

- SOEP Group. (2015) SOEP 2013 - SOEPmonitor Individuals 1984-2013 (SOEP v30). In *SOEP Survey Papers 284: Series E*. Berlin: DIW/SOEP.
- Spiess, C. K. (2008). Early childhood education and care in Germany: The status quo and reform proposals. *Zeitschrift für Betriebswirtschaftslehre*, 67, 1-20.
- Spiess, C. K., Berger, E. M., & Groh-Samberg, O. (2008). Overcoming disparities and expanding access to early childhood services in Germany: Policy considerations and funding options. *UNICEF Innocenti Research Centre Working Paper IWP-2008-03*.
- Spiess, C. K., & Tietze, W. (2002). Qualitätssicherung in Kindertageseinrichtungen Gründe, Anforderungen und Umsetzungsüberlegungen für ein Gütesiegel. *Zeitschrift für Erziehungswissenschaft*, 5(1), 139-162. doi: 10.1007/s11618-002-0008-8
- Stahl, J. F. (2017). *Socio-economic and regional inequalities in early care and education: Consequences for mothers' work-family life and children's educational opportunities*. Unpublished doctoral dissertation. University of Tübingen.
- Stahl, J. F., & Schober, P. S. (2017). Convergence or divergence? Educational discrepancies in work-care arrangements of mothers with young children in Germany. *Work, Employment & Society*, published online April 7, 2017. doi: 0950017017692503
- Statistische Ämter des Bundes und der Länder. (2015). Kindertagesbetreuung regional 2014. Wiesbaden: Federal Statistical Office.
- Statistisches Bundesamt. (2013). *Kindertagesbetreuung regional 2013. Ein Vergleich aller 402 Kreise in Deutschland*. Wiesbaden: Statistisches Bundesamt. Retrieved from: https://www.destatis.de/DE/Publikationen/Thematisch/Soziales/KinderJugendhilfe/KindertagesbetreuungRegional5225405137004.pdf?__blob=publicationFile
- Strunz, E. (2014). Kindertagesbetreuung vor Ort - Der Betreuungsatlas 2013: Eine Analyse lokaler Unterschiede. In. Dortmund: Deutsches Jugendinstitut und TU Dortmund. Retrieved from: <http://www.akjstat.tu-dortmund.de>

- Tietze, W., Lee, H.-J., Bensel, J., Haug-Schnabel, G., Aselmeier, M., & Egert, F. (2013). Pädagogische Qualität in Kindertageseinrichtungen und Kindertagespflegestellen. In W. Tietze, F. Becker-Stoll, J. Bensel, A. G. Eckhardt, G. Haug-Schnabel, B. Kalicki, H. Keller & B. Leyendecker (Eds.), *NUBBEK. Nationale Untersuchung zur Bildung, Betreuung und Erziehung in der frühen Kindheit* (pp. 69-87). Weimar: verlag das netz.
- Vandenbroeck, M., Visscher, S. D., & Nuffel, K. V. (2008). Mothers' search for infant child care: The dynamic relationship between availability and desirability in a continental European welfare state. *Early Childhood Research Quarterly*, 23(2), 245–258. doi: 10.1016/j.ecresq.2007.09.002
- Viernickel, S., Fuchs-Rechlin, K., Bensel, J., Strehmel, P., Preissing, C., & Haug-Schnabel, G. (2015). *Qualität für alle: Wissenschaftlich begründete Standards für die Kindertagesbetreuung*: Herder Verlag GmbH.
- Vorsanger, S. (2005). *Parents' perspectives on child care subsidies*. Dissertation, Columbia University School of Social Work.
- Wagner, G. G., Frick, J. R., & Schupp, J. (2007). The German Socio-Economic Panel study (SOEP) - Scope, evolution and enhancements. *Schmollers Jahrbuch*, 127, 139-169. doi: 10.2139/ssrn.1028709
- Zygmunt-Fillwalk, E. (2011). Building family partnerships: The journey from preservice preparation to classroom practice. *Journal of Early Childhood Teacher Education*, 32(1), 84-96. doi: 10.1080/10901027.2010.547653

Tables

Table 1

Descriptive statistics of all ECEC quality indicators, level of measurement and interpretation

Variable	N	Unit	Mean	SD	Min	Max	Level ¹	Int. ²
Structural quality								
<i>Group structure & staff training</i>								
<u>Observable</u> Group size	701	#children	21.87	13.04	5	136	G -	
Child-teacher-ratio	687	#children / educator	8.97	3.90	2.5	27.5	G -	
<u>Unobservable</u> Any unqualified staff in group	665		0.32	0.47	0	1	G -	
Any staff participation in further training	549		0.79	0.40	0	1	G+	
<i>Equipment, activities & group composition</i>								
<u>Observable</u> Materials for school preparation ^a	454	factor ^b	1.58	0.77	0	3.6	G+	
Materials for play ^a	506	factor ^b	2.50	0.63	0.3	3.4	G+	
Interior space per child (m ²)	490	m ²	8.09	3.39	1.1	35.1	C+	
Garden space per child (m ²)	486	m ²	20.07	16.38	0.0	94.7	C+	
Number of special-purpose rooms	473	rooms	3.39	2.54	0	15	C+	
Composition: ≥30% foreign language	655		0.25	0.43	0	1	G -	
<u>Unobservable</u> Frequency activities: arts/ games ^a	536	factor ^b	6.93	0.87	1.8	7.5	G+	
Frequency activities: verbal/ motor ^a	529	factor ^b	7.08	0.65	2.2	7.7	G+	
Frequency of offered learning activities in group ^a	664	factor ^b	5.50	1.19	1.1	6.6	G+	
Top 20% of diverse learning activities offered in center ^a	477		0.70	0.46	0	1	C+	
Orientation quality								
<i>Center level: Quality assurance & organization</i>								
<u>Observable</u> Center has a written pedagogical concept	718		0.93	0.26	0	1	C+	
<u>Unobservable</u> Any quality improvement measures last 12 months	594		0.52	0.50	0	1	C+	
Strong influence of curricular guidelines	539		0.61	0.49	0	1	G+	
Recent project documented	535		0.63	0.48	0	1	G+	
Team involved in pedagogical concept	479		0.95	0.22	0	1	C+	
Regularity of team meetings	579		1.32	0.72	0	2	C+	
<i>Educator level: Satisfaction & enthusiasm</i>								
<u>Unobservable</u> Educator's satisfaction with center	506	scale pts	8.13	1.59	1	10	G+	
Educator highly motivated	545		0.54	0.50	0	1	G+	
Enjoyment of social pedagogy ^a	514	factor ^c	-0.02	0.87	-3.1	1.1	G+	
Enjoyment of math/science ^a	538	factor ^c	-0.02	0.69	-2.2	0.9	G+	
<i>Educator level: Perceived role & educational goals</i>								
<u>Unobservable</u> Educator feels like partner	526		0.55	0.50	0	1	G+	
Educator feels like expert	528		0.59	0.49	0	1	G -	
Center responsibility: cognitive/motor competence ^a	485	factor ^c	0.04	0.93	-4.3	2.9	G+	

Center responsibility: social competence ^a	492	factor ^c	0.01	0.84	-4.6	4.1	G+
Educational goal: conformity ^a	477	factor ^c	-0.07	0.98	-3.3	2.1	G-
Educational goal: autonomy ^a	520	factor ^c	0.03	0.86	-3.4	1.2	G+
Networking with families							
<u>Unobservable</u> Parental influence ^a	597	scale pts	5.14	1.88	0	10	C+
Parents involved in development of pedagogical concept	479		0.39	0.49	0	1	C+

1 Level on which quality indicator was measured (G=group, C=center). **2** Interpretation: an increase in the indicator is positively (+) or negatively (-) associated with child development. ^a Several items. Mean refers to the average of all items included. ^b Factor is the result of polychoric factor analysis. ^c Factor is the result of factor analysis and is standardized (mean of zero in the original sample). Note: Results are weighted. Source: 2014 K²ID-SOEP extension study (own calculations).

Table 2

Results from regressions of structural quality indicators

Indicator	Standard structural characteristics				Other structural characteristics				
	Group size ^a	Child-teacher-ratio ^b	Unqualified staff ^c	Further training	Materials: school preparation	Interior space per child	Garden space per child	Activities: arts /games	≥30% foreign language ^d
Type of regression	linear	linear	logistic	logistic	linear	linear	linear	linear	logistic
Observable quality measure	yes	yes	no	no	yes	yes	yes	no	yes
Potentially disadvantaged groups									
Low parental educ. (reference)									
Medium parental educ.	-0.56 (2.46)	-1.01 ⁺ (0.53)	0.03 (0.08)	0.12 (0.08)	0.28* (0.11)	-0.51 (0.61)	5.62 ⁺ (3.25)	-0.23** (0.08)	-0.10 ⁺ (0.05)
High parental educ.	-0.09 (2.75)	-0.66 (0.54)	0.05 (0.09)	0.19** (0.07)	0.25* (0.11)	-0.48 (0.68)	6.22* (2.89)	-0.31* (0.14)	-0.17* (0.07)
Child migration backg.	2.79 ⁺ (1.62)	0.11 (0.36)	-0.04 (0.05)	0.04 (0.05)	-0.02 (0.10)	0.41 (0.55)	-4.48* (1.82)	0.22** (0.08)	0.11* (0.04)
Poor household	1.92 (2.99)	0.38 (0.85)	-0.14* (0.07)	-0.03 (0.10)	0.09 (0.14)	1.88 ⁺ (0.96)	9.96* (4.64)	0.18 ⁺ (0.10)	0.07 (0.06)
Single parent	1.63 (2.56)	0.34 (0.60)	0.24** (0.09)	0.09 ⁺ (0.05)	-0.11 (0.16)	-0.56 (0.74)	0.24 (2.64)	-0.16 (0.14)	-0.02 (0.05)
Constant	13.68 ⁺ (7.30)	10.11*** (2.04)			1.97*** (0.43)	9.23*** (1.97)	4.29 (9.25)	7.42*** (0.48)	
N	701	687	665	549	454	490	486	536	640
adj. R ² (Pseudo-R ²)	0.464	0.205	(0.088)	(0.181)	0.278	0.076	0.096	0.104	(0.340)

Note: Results are weighted; SE clustered (county) / in parentheses; ⁺ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$; Logistic regression results displayed as average marginal effects; Further control variables: child age, age at entry <3, attendance >12 months, no. children in household, older sibling in ECEC, mother's age, maternal employment, open group, age structure in center, East Germany, ECEC centers per 100 children in county, town size, neighborhood purchasing power, maternal working hours missing. Additional controls for ^acounty median group size; ^bcounty median ratio; ^ccounty share qualified staff; ^dcounty share foreign children / no. migrant households in neighborhood / information missing. Source: SOEP v31 and 2014 K2ID-SOEP extension study (own calculations).

Table 3

Results from regressions of indicators of orientation quality at center level and networking with families

Indicator	Quality assurance & organization				Networking with families	
	Quality improvement	Strong influence curric. guidelines	Team meetings every 2 weeks ^a	Team meetings ≤monthly ^a	Parental influence	Parents involved in pedagogical concept
Type of Regression	logistic	logistic	multinomial	multinomial	linear	logistic
Observable quality measure	no	no	no	no	no	no
Potentially disadvantaged groups						
Low parental educ. (reference)						
Medium parental educ.	0.12 (0.08)	-0.13 (0.09)	-0.12 (0.08)	-0.02 (0.05)	0.35 (0.32)	0.09 (0.09)
High parental educ.	0.17 ⁺ (0.10)	-0.17 ⁺ (0.09)	-0.22 ^{**} (0.08)	0.02 (0.07)	0.03 (0.33)	0.01 (0.11)
Child migration backg.	-0.11 ⁺ (0.07)	-0.08 (0.07)	0.03 (0.07)	0.01 (0.05)	-0.22 (0.25)	0.04 (0.07)
Poor household	0.06 (0.14)	0.01 (0.16)	0.08 (0.14)	-0.03 (0.09)	0.18 (0.34)	-0.16 ⁺ (0.09)
Single parent	0.13 (0.11)	-0.08 (0.12)	-0.16 ⁺ (0.10)	-0.11 ^{***} (0.03)	-1.13 ^{***} (0.33)	-0.02 (0.08)
Constant					6.88 ^{***} (1.09)	
N	594	539	579		597	479
adj. R ² (Pseudo-R ²)	(0.143)	(0.090)	(0.183)		0.068	(0.179)

^aReference: at least once a week. Note: Results are weighted; SE clustered (county) / in parentheses; + p < 0.10, * p < 0.05, ** p < 0.01, *** p < 0.001; Logistic regression results displayed as average marginal effects; Further control variables: child age, age at entry <3, attendance >12 months, no. children in household, older sibling in ECEC, mother's age, maternal employment, open group, age structure in center, East Germany, ECEC centers per 100 children in county, town size, neighborhood purchasing power, maternal working hours missing. Source: SOEP v31 and 2014 K2ID-SOEP extension study (own calculations).

Table 4

Results from regressions of orientation quality indicators at educator level

Indicator	Educator's satisfaction & enthusiasm				Educator's perception of own / center's role		
	Educator center satisfaction	Educator highly motivated	Enjoyment social pedagogy	Enjoyment math/science	Educator feels like expert	Center responsible cogn/motor competence	Center responsible social competence
Type of Regression	linear	logistic	linear	linear	logistic	linear	linear
Observable quality measure	no	no	no	no	no	no	no
Potentially disadvantaged groups							
Low parental educ. (reference)							
Medium parental educ.	-0.11 (0.28)	0.13 (0.09)	0.09 (0.16)	-0.18 ⁺ (0.11)	0.15 ⁺ (0.08)	-0.19 (0.16)	-0.20 (0.14)
High parental educ.	-0.21 (0.35)	0.19* (0.09)	-0.07 (0.20)	-0.18 (0.14)	0.09 (0.10)	-0.48** (0.18)	-0.15 (0.16)
Child migration backg.	-0.36* (0.18)	-0.03 (0.07)	-0.09 (0.13)	0.07 (0.10)	-0.12 ⁺ (0.06)	-0.03 (0.11)	0.24 (0.16)
Poor household	-0.99* (0.47)	-0.17 ⁺ (0.09)	0.35 ⁺ (0.19)	0.12 (0.16)	0.10 (0.11)	0.09 (0.24)	-0.01 (0.19)
Single parent	0.31 (0.34)	0.14 ⁺ (0.07)	0.02 (0.17)	-0.12 (0.14)	0.08 (0.09)	-0.75*** (0.15)	-0.23* (0.11)
Constant	8.76*** (1.18)		0.48 (0.50)	-1.06* (0.47)		0.24 (0.51)	0.48 (0.42)
N	506	545	514	538	528	485	492
adj. R ² (Pseudo-R ²)	0.073	(0.092)	0.153	0.102	(0.083)	0.149	0.081

Note: Results are weighted; SE clustered (county) / in parentheses; + p < 0.10, * p < 0.05, ** p < 0.01, *** p < 0.001; Logistic regression results displayed as average marginal effects; Further control variables: child age, age at entry <3, attendance >12 months, no. children in household, older sibling in ECEC, mother's age, maternal employment, open group, age structure in center, East Germany, ECEC centers per 100 children in county, town size, neighborhood purchasing power, maternal working hours missing. Source: SOEP v31 and 2014 K2ID-SOEP extension study (own calculations).

Appendix

Table A.1

Operationalization of latent quality indicators using (polychoric) factor analysis

Indicator	Original scale	Method & question; factor & items (cronbach's α)
<i>Materials ...</i>	0 (nonexistent) to 3 (almost all children)	Polychoric factor analysis of group educators' ratings of the share of children (none, some, about half, almost all) being able to play with different materials at the same time
... for school preparation		<i>Factor 1</i> (6 items): Books and other materials a) for first-time readers; b) that support learning of letters; letter-sound-allocation; and dealing with geometric forms and spatial patterns; c) that familiarize children with measuring; and with figures/numbers and counting ($\alpha=.81$)
... for play		<i>Factor 2</i> (5 items): Picture books; drawing and writing material; bricks; socially stimulating material; and dolls and hand/finger puppets ($\alpha=.76$)
<i>Activities (freq)</i>	1 (never) to 7 (daily)	Polychoric factor analysis of group educators' ratings of the frequency with which different activities are performed in the group
Arts / games		<i>Factor 1</i> (4 items): Painting or other artistic activities (e.g. doing handicrafts); construction (playing with building blocks, Lego and the like); puzzles; and playing parlor games (e.g. memory) ($\alpha=.73$)
Verbal / motor		<i>Factor 2</i> (4 items): Reading or telling a story or looking at picture books; singing, making music, or dancing; motor games (e.g. playing tag); and finger or language games (guessing, rhyming) ($\alpha=.68$)
Offered activities (freq)	1 (not offered) to 6 (several times a week)	Polychoric factor analysis of group educators' ratings of the frequency with which different learning opportunities are offered to the children
		<i>Factor 1</i> (4 items): Early musical education; painting and other artistic activities; development of the German language; support in development of mathematical skills ($\alpha=.66$)
<i>Enjoyment ...</i>	1 (no pleasure) to 6 (great pleasure)	Factor analysis of group educators' ratings of how enjoyable they find integrating different themes into their pedagogical work
... of social pedagogy		<i>Factor 1</i> (3 items): Social topics; intercultural education; pedagogy ($\alpha=.71$)
... of math / science		<i>Factor 2</i> (2 items): Math; natural sciences ($\alpha=.62$)
<i>Responsibility ...</i>	1 (only the family) to 7 (only the center)	Factor analysis of group educators' assessment as to whether the family or ECEC center should primarily promote a set of skills in children
... for cogn. / motor comp.		<i>Factor 1</i> (4 items): Fostering pleasure in motor games; rhymes and poetry; making the children deal with natural phenomena; and familiarize with numbers and letters ($\alpha=.74$)

... for social comp.		<i>Factor 2</i> (3 items): Teaching children how to solve conflicts peacefully and verbally; to adhere to agreed rules; and to find solutions themselves ($\alpha=.75$)
<i>Educational goals</i>	1 (not important at all) to 5 (very important)	Factor analysis of group educators' importance ratings of different educational goals
Conformity		<i>Factor 1</i> (8 items): The child behaves like normal girl/boy; has good manners; and good self-control; obeys their elders and betters; is neat and clean; will be good in school; learns to avoid risks in life; is liked by others/ friendly ($\alpha=.82$)
Autonomy		<i>Factor 2</i> (5 items): the child is responsible; has good judgment; strives to achieve their goals; has good self-control; and is considerate of others ($\alpha=.75$)

Source: 2014 K²ID-SOEP institution survey.

Table A.2

Descriptive statistics of all independent variables

Variable	N	Mean	SD	Min	Max
Low caregiver education	818	0.19	0.40	0	1
Medium caregiver education	818	0.52	0.50	0	1
High caregiver education	818	0.29	0.45	0	1
Child migration background	818	0.33	0.47	0	1
Poor household	818	0.09	0.28	0	1
Single parent	818	0.09	0.29	0	1
Child age ≤ 2	818	0.21	0.41	0	1
Child age 3	818	0.20	0.40	0	1
Child age 4	818	0.26	0.44	0	1
Child age ≥ 5	818	0.33	0.47	0	1
Age at entry <3 years	818	0.64	0.48	0	1
Attendance of center >12 months	818	0.68	0.47	0	1
1 child in HH	818	0.29	0.46	0	1
2 children in HH	818	0.50	0.50	0	1
≥ 3 children in HH	818	0.21	0.40	0	1
Older sibling in ECEC	818	0.14	0.35	0	1
Mother's age	818	34.69	5.75	17	56
Long part-time or full-time empl. mother (>25 hours)	796	0.31	0.46	0	1
Part-time empl. mother (≤ 25 hours)	796	0.28	0.45	0	1
Non-working mother	796	0.40	0.49	0	1
Working hours missing	818	0.03	0.16	0	1
Open group	818	0.09	0.28	0	1
Center serves children below 3	818	0.79	0.41	0	1
Center only serves children from 3 years	818	0.18	0.38	0	1
Information on age composition missing	818	0.03	0.18	0	1
Town size: small	818	0.38	0.49	0	1
Town size: medium	818	0.40	0.49	0	1
Town size: large	818	0.22	0.41	0	1
HH purchasing power (street section)	818	102.54	22.27	49.4	169.3
ECEC centers per 100 children (county)	818	1.27	0.25	0.7	2.4
East Germany	818	0.22	0.42	0	1
District group size (median)	774	21.63	2.88	14	27
District group size missing	818	0.07	0.25	0	1
District child-teacher-ratio (median)	818	9.61	1.74	7.0	16.6
District % staff with specialized vocational/university training	818	75.43	12.25	47.2	96.5
District % children in ECEC with foreign origin/family language	818	18.76	11.63	0.9	56.9
Migrant households in residential block	781	1.68	3.54	0	45.2
Information on migrant households missing	818	0.04	0.20	0	1

Note: Results are weighted. Source: SOEP v31 and 2014 K2ID-SOEP extension study (own calculations)